PAYSON[19] has published a monograph of the genus *Lesquerella*, recognizing fifty-two species, only two of which are new. The synonymy and specimens examined are recorded in detail. Preceding the taxonomic presentation, there is an interesting discussion of the general morphology, phylogeny, and geographical distribution of the genus.

PETCH,[20] in continuation of his studies of entomogenous fungi, has presented a very detailed account of *Hypocrella* and *Aschersonia*. In *Hypocrella* twenty-nine species are described, two of which are new; while in *Aschersonia* thirteen species are described, four of which are new. In addition to the species included in the systematic presentation, a number of species are named as not seen, doubtful, or excluded.—J. M. C.

Origin of variations.—Of extreme interest to students of genetics is a recent number of the *American Naturalist* which contains the papers presented at the Toronto meetings in a symposium on "The origin of variations." JENNINGS,[21] discussing "variation in uniparental reproduction," stresses the fact that the vast majority of observed variations in primitive organisms are strictly non-heritable. There exists, however, a very small residuum of heritable variations, and in considering their evolutionary significance, two types should be distinguished. Seemingly spontaneous changes (mutations ?) appear to have occurred in some forms during a series of asexual generations, and have been isolated by selection to produce new constant races. The cause of these changes is unknown. On the other hand, variations have been induced by environmental changes, which have always reverted to the normal type after a certain number of asexual generations. JENNINGS points out that the period of persistence of such variations evidently depends, in good part, on the number of generations through which the producing agent acted, and expresses the belief that heritable characters, as permanent as any that are known to exist, might be produced by allowing the producing agent to act over a sufficient period of time.

BLAKESLEE[22] describes his work on *Datura*, which by this time has become well known,[23] showing how striking heritable variations accompany changes in chromosome number. These changes in chromosome number may result either from non-disjunction of one or a few chromosome sets, producing "unbalanced types," or may involve a wholesale doubling of all the chromosome sets, giving

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[19] PAYSON, E. B., A monograph of the genus *Lesquerella*. Ann. Mo. Bot. Gard. **8**: 103–236. *figs. 34.* 1921.

[20] PETCH, T., Studies in entomogenous fungi. II. The genera *Hypocrella* and *Aschersonia*. Ann. Roy. Bot. Gard. Peradeniya **7**: 167–278. *pls. 2–5.* 1921.

[21] JENNINGS, H. S., Variations in uniparental reproduction. Amer. Nat. **56**: 5–15. 1922.

[22] BLAKESLEE, A. F., Variations in *Datura* due to changes in chromosome number. Amer. Nat. **56**: 16–31. 1922.

[23] BOT. GAZ. **72**: 178–182. 1921.

the "balanced" tetraploid (or indirectly, triploid) types. The tetraploid types breed true, but the others produce (in various proportions) several types of progeny, including individuals like themselves and others like the "normal" (pure diploid) original ancestors.

MULLER[24] takes up changes in the individual gene ("locus changes" or true mutations), and discusses their general characteristics. It is important to realize that the change is not always a mere loss, for clear-cut reverse mutations have been obtained in corn, *Drosophila*, and *Portulaca*. If the original mutation was a loss, the reverse mutation must be a gain. "It is generally true that mutations are much more apt to cause an apparent loss in character than a gain, but the obvious explanation for that is, not because the gene tends to lose something, but because most characters require for proper development a nicely adjusted train of processes, and so any change in the genes, no matter whether loss or gain, substitution or arrangement, is more likely to throw the developmental mechanism out of gear, and give a 'weaker' result, than to intensify it." MULLER depicts a very interesting and suggestive analogy between the gene and certain immunity reactions.

BRIDGES[25] elucidates the following very significant thesis. The characters of an organism, instead of being absolutely "determined" by a single gene, should rather be thought of as being acted upon simultaneously by many genes. Some genes tend to make a character more pronounced, and others to make it less pronounced, so that the grade of development actually realized by each particular character will be determined by the equilibrium between its modifying genes. The justification for this thesis appears from a consideràtion of some of BRIDGES' non-disjunctional *Drosophilas*, which exhibit previously unknown grades in the expression of a number of characters. Most startling are the cases where the character involved is sex itself; so that the fruitfly, previously the best known example of qualitative differentiation of sex on the basis of the X and Y chromosomes, now provides the most promising example of a quantitative sex mechanism with the newly discovered "intersexes" and "supersexes."[26]

EMERSON[27] presents and classifies a great mass of evidence on bud variation. He considers separately "somatic mutation of genes" and "somatic segregation," and under the latter heading "chromosome elimination," "cytoplasmic segregation," and "graft hybrids and other chimeras." This article should be of unusual interest to botanists.

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[24] MULLER, H. J., Variations due to change in the individual gene. Amer. Nat. **56**:32–50. 1922

[25] BRIDGES, CALVIN B., The origin of variations in sexual and sex-limited characters. Amer. Nat. **56**:51–63. *figs. 7*. 1922.

[26] BOT. GAZ. **72**:408–410. 1921.

[27] EMERSON, R. A., The nature of bud variations as indicated by their mode of inheritance. Amer. Nat. **56**:64–79. 1922.

GUYER[28] draws the following conclusions from his own well known experiments with white rabbits, and from the results of other investigations. Basically inheritance is mainly a question of the perpetuation of specific protein-complexes, and development the result of differential reactions of these same fundamental constituents under differing conditions of environment. There is evidently some degree of constitutional identity, probably protein homology, between the nature substance of a tissue and its correlative in the germ. Changes which can affect certain constituents of tissue cells initiate an influence which, borne in the circulating fluids of the body, evidently is able to affect the homologous constituents of the germ cells. This, of course, furnishes the basis for a Lamarckian view. The author feels that here may be a basis for progressive evolution.—M. C. COULTER.

Influence of host on parasite.—Continuing his studies on the physiology of parasitism, BROWN[29] has investigated the exosmose of substances from leaf and petal surfaces of several flowering plants, and the influence of such substances on the behavior of *Botrytis* spores. Drops of distilled water uniform in size were placed for twenty-four hours on petals of *Cereus*, *Phyllocactus*, *Gloxinia*, *Lilium*, *Papaver*, *Iris*, *Petunia*, *Tulipa*, *Rosa*, *Begonia*, *Viola*, *Lathyrus* (sweet pea), *Dahlia*, *Geranium*, *Cydonia*, *Pyrus*, and on leaves of several plants, including the broad bean. The change in the drops due to exosmose was determined by studying their capacity for germinating spores added to the drops in water suspensions, and also by electrical conductivity tests. Capacity for germinating spores was based on the average length of the germ tubes. An increase in conductivity resulted in all cases, accompanied in the greater number of plants studied by increased germination capacity, when the drops subjected to exosmose were compared with drops of distilled water of similar size. Petals difficult to wet gave lower conductivity and germination figures. In some plants, with leaves of *Tradescantia discolor*, for instance, increased conductivity was accompanied by germination capacity only equal to or less than that of distilled water, or by actual inhibition of germination. The exact source and nature of the inhibiting substance were not determined.

Attention is directed to the difference in the behavior of fungal parasites. Some, like the rust fungi, penetrate both susceptible and immune varieties of plants, their fate thereafter being determined by internal conditions. Contrasted with this is the behavior of *Botrytis* spores on the leaf of the broad bean, typical of another category of fungal parasites, in which the germination and attack depend upon the exosmose of substances into the infection drop, which can be used as a nutrient by the fungus.—J. G. BROWN.

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[28] GUYER, M. F., Serological reactions as a probable cause of variation. Amer. Nat. **56**:80–96. 1922.

[29] BROWN, WILLIAM, Studies in the physiology of parasitism. Ann. Botany **36**:101–119. 1922.